

- Fig. 14. *Gulella disseminata kekumegacensis*, Connolly.
 Fig. 15. *Streptostele sinulabiata*, Connolly.
 Fig. 16. — *hasta*, Connolly.
 Fig. 17. — *clavulus*, Connolly.
 Fig. 18. — *crassicrenulata*, Connolly.
 Fig. 19. *Gruptostele iota*, Connolly.
 Fig. 20. — *candelula*, Connolly.
 Fig. 21. *Gulella pisa*, Connolly.
 Fig. 22. *Streptostele patruelis*, Connolly.
 Fig. 23. — *nyiroensis*, Connolly.
 Fig. 24. — *osculum*, Connolly.
 Fig. 25. — *ordinaria*, Connolly.
 Fig. 26. *Raffraya taylori* (Gibbons).
 Fig. 27. *Gulella gwenzolinæ scissidens*, Connolly.
 Fig. 28. — *candela*, Connolly.
 Fig. 29. *Streptostele columna*, Connolly.
 Fig. 30. — *crassiplicata*, Connolly.
 Fig. 31. *Varicostele curvicolumella*, Connolly.
 Fig. 32. *Ptychotrema fisheri*, Connolly.
 Fig. 33. *Gulella impedita*, Connolly.
 Fig. 34. — *perlata*, Connolly.
 Fig. 35. — *calva*, Connolly.
 Fig. 36. — *cancellata*, Connolly.
 Fig. 37. — — *minor*, Connolly.
 Fig. 38. — *solutationis*, Connolly.
 Fig. 39. — *dupuisi*, Connolly.
 Fig. 40. *Raffraya constricta*, Connolly.
 Fig. 41. — *cylindrica*, Connolly.
 Fig. 42. — *unidentata*, Connolly.
 Fig. 43. *Marconia elgonensis* (Preston). Uasin Gishu Plateau.
 Figs. 44, 46, 48, 52-57. *Marconia elgonensis* (Preston). Darugu R. Valley.
 Figs. 45, 47. *Marconia elgonensis* (Preston), paratypes. Mt. Elgon.
 Fig. 49. *Marconia latula* (Mts.). Butumbi.
 Fig. 50. — — (Mts.). Migere.
 Fig. 51. — *margarita* (Prest.). Kigezi.
 Fig. 58. — *latula* (Mts.). I. Mutanda.
 Figs. 59, 60. — *margarita* (Prest.). Fort Portal.

Figures 32 and 43-60 are the exact size of the shells; all the rest are more or less enlarged.

LII.—*Some new Asilidæ from Western Australia.* By WILLIAM J. DAKIN, D.Sc., F.L.S., F.Z.S., Derby Professor of Zoology, University of Liverpool, and M. G. C. FORDHAM, B.Sc., Assist. Lect. Zoology, University of Liverpool.

[Plate XV.]

DURING the period that one of the authors occupied the Chair of Zoology in the University of Western Australia, an attempt was made to bring together a collection of West-Australian insects, particularly of the Diptera. When the *Ann. & Mag. N. Hist.* Ser. 9. Vol. x. 35

immense area of the State is taken into consideration, the amount of material collected was indeed small. But the same criticism might be applied to the combined collections of Diptera made in the western half of the continent. Very little is really known of the Dipterous fauna, and this is, perhaps, a little remarkable, seeing that Lepidoptera are not

Fig. 1.



Map showing distribution of species described.

common in Western Australia, whilst the Diptera are always a nuisance and often a danger.

One of the results of our effort was the collection of a number of interesting Asilids. Several of these were presented by friends, especially by Mr. J. J. Clark, of the Entomological Department. The specimens have been examined in England, and amongst them we have found at least one

new genus and five new species. There are other records of interest. In this connection attention may once more be drawn to the lack of thought (or of knowledge) in preserving data relative to the distribution of animal life in Australia. Labels, too frequently, give Western Australia as a locality! Few people in Europe seem to be aware that the State is equal in area to the United Kingdom, Germany, France, Italy, Norway, and Spain together. The climatic differences between the extreme tropical north and the wet winter country round Albany in the south are more than would be expected from the distance separating the two regions.

Some specimens of the Asilidæ from Western Australia must have been collected in the "early days" of the State. A few of these are to be found in the British Museum collections, and odd specimens have been seen by one of the writers in certain other museums. Almost all the British Museum specimens were discussed by Ricardo in her papers on the Asilidæ of Australasia (Ann. & Mag. Nat. Hist. 1912 and onwards). Since the publication of Ricardo's papers, White, of Tasmania, has contributed a paper on the Asilidæ of Australia, in which eight new species from Western Australia are described. Two of White's species (the types of which are probably somewhere in Australia) appear in our collection. A list of the West-Australian Asilids, with their distribution, is appended (p. 520).

It was considered advisable to examine the genital armature of the species in our collection, but no attempt will be made here to discuss the genital armature of the Asilidæ. Much more material is necessary, and we have, indeed, grudged damaging the few specimens in our possession. It will be seen that the genital armature of two of the species is rather striking (text-figs. 4, 5, & 6), and, in fact, quite different from that of the other specimens examined (text-fig. 3). Whilst the two species are extremely unlike in general form and appearance, they belong to closely related genera. One of them is a new species of the genus *Neosaropogon*, created by Ricardo for two species previously known. The other is a species which cannot be fitted into existing genera, although it closely approaches *Neosaropogon*. We had no doubt from the general form, etc., that this was a genus quite distinct from *Neosaropogon*. The discovery of the similarity of the genital armature was therefore surprising. However, in view of the fact that practically nothing is known of the genital armature in the Asilidæ, it is not

Asilidae known from Western Australia.

Name of Species.	Locality in W. Australia.	Distribution outside W. Australia.	Described by
<i>Asilus pelago</i>	♂, Swan River.		Walker.
— <i>blaso</i>	♂, Perth.	N.S. Wales, ♀, and Adelaide.	Walker.
<i>Bathypogon tristis</i>	♂, Perth.	♂ ♀, Dandenong Ranges.	White.
— <i>pedanus</i>	♂, Swan River.	.....	Walker.
<i>Blepharotes coriarius</i>	♂ ♀, West Australia.	Melbourne, ♀ ♂; Moreton Bay.	Wiedemann.
— <i>flavus</i>	♂ ♀, Northam.	Queensland and Victoria.	Ricardo.
<i>Chrysopogon albopunctatus</i> .	♂, Fremantle and Champion Bay.	N.S. Wales.	Macquart.
— <i>splendidiusimus</i>	♂, Champion Bay; ♀, West Australia.	.....	Ricardo.
— <i>queenslandi</i>	♀, West Australia.	♂ ♀, Queensland.	Ricardo.
— <i>nigricans</i>	♀, Perth.	.....	White.
— <i>rufulus</i>	♀, Perth.	.....	White.
<i>Laphria telestes</i>	♂ ♀, West Australia.	♂, N.S. Wales.	Walker.
— <i>clavata</i>	♀, Perth.	.....	White.
<i>Leptogaster occidentalis</i> ..	♂, Perth.	.....	White.
<i>Machimus forresti</i>	♀, Cunderdin.	.....	Dakin & Fordham.
— <i>neoitamus maculatus</i>	♀, West Australia.	.....	Dakin & Fordham.
— <i>cygnis</i>	♀, Perth.	.....	White.
<i>Neosaropogon froggattii</i> ..	♀, Bremer Bay.	.....	Dakin & Fordham.
<i>Paravatus macrostylus</i>	♂ ♀, Champion Bay.	.....	Dakin & Fordham.
<i>Phellus glaucus</i>	♂ ♀, Swan River and interior of W. Australia.	♂, Mallee Distr., Victoria, and N.S. Wales.	Loew.
— <i>piliferus</i>	♂, Cape Riche.	.....	Walker.
<i>Sarostopogon clarkii</i>	♀, Cunderdin.	.....	Dakin & Fordham.
<i>Saropogon rubescens</i>	♀, Perth.	.....	Dakin & Fordham.
<i>Stenopogon elongatus</i>	♂, Perth; ♂, Swan River.	.....	White.
— <i>micoteles</i>	♂, Swan River.	♂ ♀, N.S. Wales, Tasmania, S. Australia, Queensland.	Macquart.
		.....	Walker.

possible to do otherwise than create a new genus for the second species—the genus *Questopogon*. It appears as if there is a subsection in the Dasyopogoninæ comprising a number of closely related genera of which *Neosaropogon* and *Questopogon* are two. It will be a point for future investigation in work on this group*.

Asilidæ.

LEPTOGASTRINÆ.

Phellus piliferus, sp. n.

(Pl. XV. fig. 2; wing, text-fig. 2, A.)

The genus *Phellus* was founded by Walker for one species, and only one species—*Phellus glaucus*—has been known up to the present. This form is peculiarly West Australian, and more especially coastal. It has been stated by Froggatt to occur inland, and we can verify this statement, having specimens from Cunderdin.

As is well known, it is a very large and fine-looking fly, measuring 45 mm. in length. The new species, which may be named *Phellus piliferus*, is equally large and even more striking. There is one specimen only in our collection—a male from Cape Riche (see map, text-fig. 1) on the extreme south coast, a very different environment from the Swan River district. There is, however, a female in the British Museum Collection, and this has not been described. Fortunately, therefore, the two sexes are known.

Face.—Brownish yellow, the greater part being hidden by a thick bushy moustache of many long golden-yellow hairs.

Head clothed behind with yellow hairs and also beneath.

Antennæ.—Third joint brown-red, the two basal joints black. The third joint quite twice as long as the other two.

Thorax.—Black, with delicate sparse black hairs on dorsal surface. Laterally the hairy covering is thicker, and stout brown bristles are present. The bristles are rather like those found in the same position on *P. glaucus*, but are more obvious (perhaps owing to state of preservation). Posteriorly the thorax bears a covering of stout yellowish-white hairs. Ventral surface with pale yellow hairs between leg-bases.

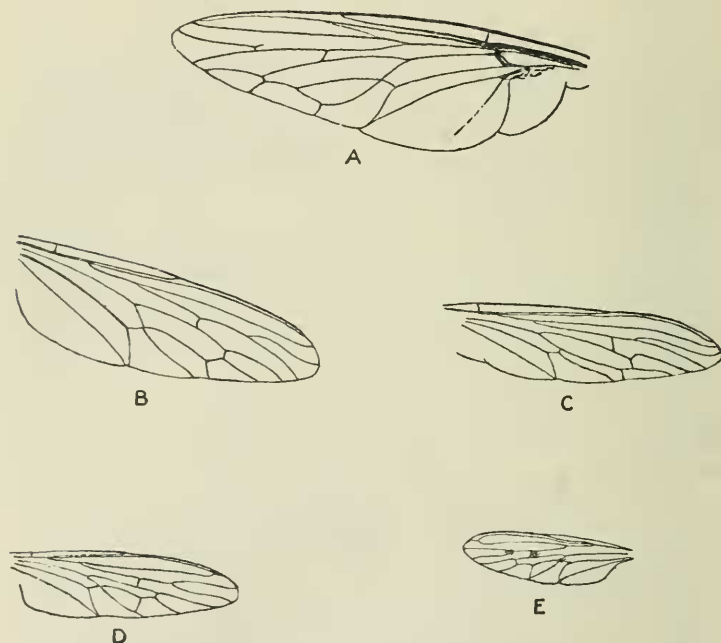
Legs.—Superficially there is no great difference from *P. glaucus* in the colour and vestiture of the legs. They are

* The authors would like to thank Major Austin, of the British Museum, for his assistance, and to state that the types of the new species are now in the B.M. Collection.

black in colour, with the tips of an ochreous or tawny tint. Claws black. Pulvilli light yellow. Stout yellow hairs, similar to those which give the tawny appearance to the tips of the feet in *P. glaucus*, extend amidst the black hairs of the more proximal tarsal segments in *P. piliferus*, especially on the first and second legs.

Yellow bands occur on the hind legs through the presence

Fig. 2.



A. *Phellus piliferus*.
 B. *Questopogon clarkii*.
 C. *Neosaropogon froggattii*.

D. *Neoitamus cygnis*.
 E. *Machimus forrestii*.

of yellow hairs amidst the black on the distal fifth of the tibia and the distal half of the first basal segment. Pale yellow hairs are present on the underside of the femur and tibia, more especially on the hind feet.

Abdomen.—The most striking feature of the species, which separates it at a glance from *P. glaucus*, is the vestiture of the abdomen. This difference is conspicuous in the two

illustrations (Pl. XV. figs. 1 & 2). In *P. glaucus* (fig. 1) the abdomen is deep metallic blue, with the first two segments thickly covered above with pale yellow hairs. In *P. piliferus* (fig. 2) all the abdominal segments bear, dorsally, a dense covering of bronze-coloured hairs, which are longest over the genital armature.

DASYPOGONINÆ.

Neosaropogon froggattii, sp. n.

The genus *Neosaropogon* was created by Ricardo for species distinguishable from *Saropogon* by their large size, by the absence of any visible style to the third joint of the antennæ, by the fourth posterior cell of the wing being not quite closed or widely open, and by the moustache being composed of numerous bristles about the same size arranged fan-like above the oral opening.

Three species were placed in this genus—viz., *N. princeps*, Macquart, *N. salinator*, Walker, and *N. clavipennis*, Ricardo. The first and the last-named are only recorded from Eastern Australia. *N. salinator* is recorded from the extreme north at Port Darwin in the Northern Territory.

Neosaropogon froggattii, sp. n., the type of the new species, is a female from the extreme south coast of Western Australia—Bremer Bay. It is a large species (30–35 mm. in length), with a conspicuous ochreous-yellow abdomen, except for the posterior segments, which are black. The legs are banded black and yellow.

Face.—Pale yellow.

Antennæ.—Blackish, with more brownish tint on under surface nearer apices. First two joints with blackish bristles, third joint bare and about $1\frac{1}{2}$ to 2 times length of first two joints together.

Moustache of stout white bristles arranged in the characteristic manner of the genus.

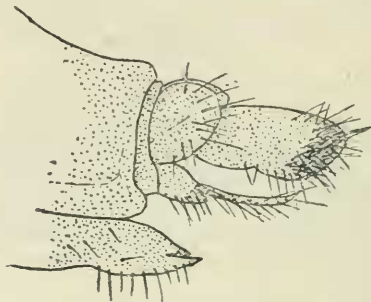
Back of *head* with stout black hairs above behind eyes and white hairs below.

Thorax.—Very dark brown, almost black, above with indication of black stripes. Grey tomentum covering sides and extending on coxæ of legs. Dorsum with numerous short black bristles and with long stout black bristles above the root of wing. Scutellum with two stout black bristles, not so long as some of those on posterior part of dorsum of thorax.

Abdomen.—Black along lateral margins, but the greater

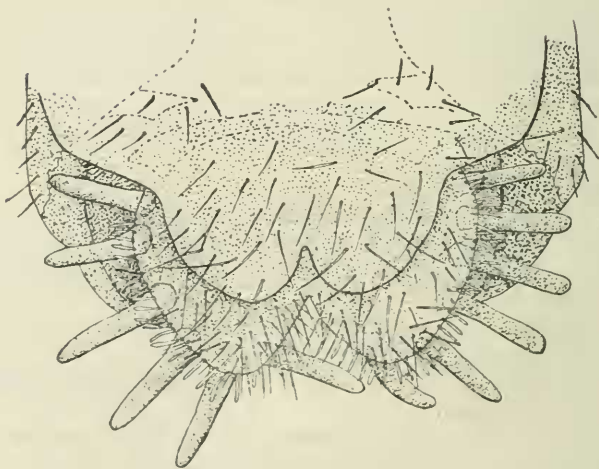
part of dorsal surface yellow-ochre and the ventral surface of a similar tint. The anterior segment is black and the last three completely black. Some grey tomentum is found on

Fig. 3.



Chrysopogon albopunctatus. Lateral view.

Fig. 4.



Neosaropogon froggattii. Ventral view.

the black lateral areas of the more anterior segments and a few small whitish hairs on the same part. Dorsal surface free from hairs and shiny.

Legs.—Distinctly banded in appearance, femur being very dark brown or black, first third of all tibiæ being light yellow and distal two-thirds black. The proximal part of first segment of tarsi is light yellow and the rest black.

Femora, tibiæ, and tarsi all covered regularly with very short black bristles. In addition to this general covering, there are numerous stout bristles on the tibiæ and tarsi and one or two on hind femora.

Wings (text-fig. 2, C).—Faintly tinged brown.

Halteres.—Yellow-brown.

This is the first record of the genus *Neosaropogon* from the State of Western Australia, and far away from the tropical region of the Northern Territory, whence *N. salinator* is recorded. The most conspicuous difference from *N. salinator* is the colour of the abdomen anteriorly and the colour of the legs.

Genital armature (text-fig. 4).—It is unfortunate that no male specimen has been discovered, as the tip of the abdomen of the female is quite interesting in structure and different from the other Asilids we have examined except *Questopogon clarkii*. The structure is sufficiently well illustrated in the figure, which is a ventral view. The stout styles, six in number on each side, are very conspicuous, and they do not occur in other Dasypogoninæ we have examined except *Questopogon*. It is impossible, however, to use this structure at present for purposes of classification, for naturally it has not been possible to examine the posterior end of the abdomen minutely (usually it necessitates removing and mounting the genital appendages) except in a few of our own specimens. We cannot even say that it is characteristic of the genus *Neosaropogon*. Most likely, however, it is characteristic of a subgroup of genera to which both *Neosaropogon* and *Questopogon* belong.

Questopogon clarkii, gen. et sp. n. (Pl. XV. fig. 3.)

Two specimens, females, of some size (27 mm.), from Cunderdin, Western Australia, belong to the Dasypogoninæ, but it is apparently impossible to place them in any of the genera already described, although they come near to *Saropogon*. The largest of the species from Australia is given as 15 mm. Ricardo has instituted the genus *Neosaropogon* for certain species distinguished from *Saropogon* by their larger size, but other features—the absence of any visible style to the third joint of the antennæ and the character of the moustache,

—as well as general form, mark off *Neosaropogon* from the new genus *Questopogon*. It belongs to the group of *Dasyopogoninae* in which the fore tibiae bear stout curved spines. The third joint of the antennae bears a short terminal style and is about $1\frac{3}{4}$ times the length of the two basal segments together. The fourth posterior cell of the wing (text-fig. 2, B) is open. The abdomen is not club-shaped. The body is robust and dark in colour (black, with dark legs, reddish below), with metallic-like tomentum on shoulders of thorax, and with bands of pale yellow hairs on abdomen which give rise to iridescent markings according to the direction of the light falling on the body.

Face with yellow tomentum. Tubercle extending up to antennae. Moustache abundant and white or pale yellow in colour, extending up to base of antennae.

Palpi black, with black and white pubescence, bearing slightly stronger black hairs at apex.

Antennae black, with third joint $1\frac{2}{3}$ – $1\frac{3}{4}$ times the length of the first two combined. Style short and with abrupt concave apex.

Thorax.—Black, with golden tomentum on shoulders and laterally; delicate black hairs on dorsal surface, with very stout white bristles on marked postalar calli and a few similar bristles on posterior margin of scutellum.

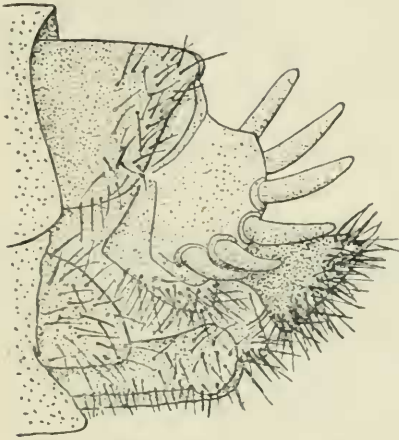
Abdomen.—Shining black, depressed, and comparatively broad, gradually diminishing in width to the posterior segment. The abdomen presents a banded appearance in certain lights, due to the arrangement of a close covering of pale yellow iridescent hairs. Each segment possesses laterally a conspicuous area of yellow-bronze tomentum—this is confined laterally and to the posterior half of each segment. The hairs on the dorsal surface of the abdomen are directed outwards (to the right and left sides) on the posterior half of each segment, but on the anterior half of each segment the hairs are directed inward toward the median line. The hairs on the tomentum areas are directed outwards. The hinder segments are not so well clothed with hairs, the two posterior ones possessing only a poor vestiture.

Legs.—Coxae black, with white hairs. Femora red below, dark red, almost black, above. Tibiae dark reddish brown, the first and second with black towards the distal end. Tarsi black. All tibiae and tarsi with stout and long white bristles.

Wings.—Not altogether clear. Marginal cells just slightly brown. Structure and venation as illustrated (text-fig. 2, B). Fourth posterior cell open.

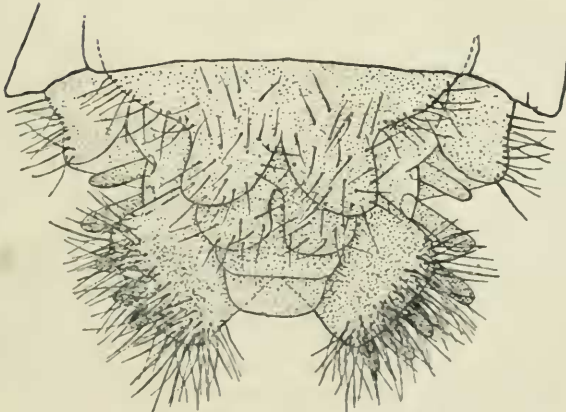
Genital armature (text-figs. 5 & 6).—Somewhat to our surprise, seeing that there is little resemblance in the general

Fig. 5.



Questopogon clarkii. Lateral view.

Fig. 6.



Questopogon clarkii. Ventral view.

appearance of the body, the tip of the abdomen of this form presented the same complicated structure as *Neosaropogon*

clarkii. On the other hand, although the two species differ considerably at first sight, it has been shown above that the two genera are closely related. The genital armature is in agreement with this. The same six large styles are present on each side, but the remaining structure is more complicated than that of *Neosaropogon*. There is no point in describing the details here. The illustrations should suffice until we have material for a more complete work on the genital armature of the Asilidæ.

Subgenus *NEOITAMUS*, Ost.-Sack.

Neoitamus cygnis, sp. n.

Only one species of *Neoitamus* has been recorded from Western Australia—*Neoitamus maculatus*, White,—and, since White only gives the locality as Western Australia, this means about the same as stating that one specimen of some species had been found in Europe.

There are two specimens of the new species in the collection. Both are females, and were caught in the suburbs of Perth.

Size 22 mm.

Face.—Covered with grey tomentum. Moustache composed of yellowish-white bristles, beard white. Antennæ black. Forehead with short black bristles at sides of ocelli. Stout white and black bristles behind upper part of head.

Thorax.—Black, with grey tomentum. There is a well-defined black median stripe free from tomentum, broadest anteriorly, and two dorso-lateral dark areas. Stout black bristles on sides of thorax and two on posterior border of scutellum. Scutellum with grey tomentum.

Abdomen.—Black, with grey tomentum at sides and at segmentations. Some white pubescence ventrally.

Ovipositor.—Black and shiny.

Legs.—Femora black. Tarsi black above. Proximal part of tibia yellow-brown above, and the whole joint of this colour below. Fore femora with four stout black bristles below. Middle femora with four slightly weaker bristles. Hind femora with three black bristles near distal extremity, and a few yellowish bristles in the place of the stout black bristles of the anterior femora. All femora with weak grey or white pubescence. Tibiæ and tarsi well armed with black bristles.

Wings (text-fig. 2, D).—Clear. Veins dark brown, lighter at base. Small transverse vein at about $\frac{2}{3}$ of discal cell.

Subgenus MACHIMUS, Loew.

Only one species has been recorded up to date from the Australasian region, Ricardo having placed the species *Asilus antilco* of Walker (British Museum Collection) in this subgenus of the old *Asilus*.

A specimen in our collection, unfortunately a female, seems to belong to this subdivision; but, whilst its specific characters seem to be quite satisfactory, the same cannot be said of the generic position. The boundaries of these subgenera of *Asilus* are very unsatisfactory, and will have to be redefined in the future. Unfortunately there are still too few specimens from Australia to take the matter up with the Australian species.

Machimus forrestii, sp. n. (Pl. XV. fig. 4.)

Type (female) from Cunderdin, Western Australia. The species is blackish.

Face.—Black. The moustache consists of black bristles above and white bristles below.

Antennæ.—Black. The third joint with no hairs. A few black hairs are present on the basal joints.

Thorax.—Uniformly black, with long black bristles posteriorly. A few whitish hairs are present on the scutellum.

Legs.—Black, except tibiæ and tarsi, which are light brown. There are white hairs on the coxæ. The anterior femora are clothed with black hairs and possess a very few black bristles. There are a few black bristles on the middle femora and more on the hind femora. All tibiæ and tarsi bear numerous black bristles as well as a covering of fine hair.

Wings (text-fig. 2, E).—Hyaline, with brown pigment on the cross-vein and at the fork of the third longitudinal vein.

Abdomen.—Colour dull black. Black bristles are well developed on the posterior margin of the segments, especially on the anterior segments. There are also some delicate white hairs on these segments. Laterally there are inconspicuous and small areas of grey tomentum on each segment.

Ovipositor laterally compressed.

Size 17 mm.

SPECIES RECORDED FOR THE FIRST TIME FROM
WESTERN AUSTRALIA.

ASILINÆ.

Blepharotes flavus, Ricardo.

Two specimens in the collection appear to belong to this

species, which was established by Ricardo for specimens from Queensland and Victoria. The range of the species—the specimens in our collection came from Northam—is thus very wide, extending completely across the Australian continent. The specimens, which include male and female examples, do not differ from those described for the Eastern States. The size is markedly different from that of *Blepharotes coriarius*, Wiedemann, being smaller—our specimens of *B. coriarius* are 40 mm., whilst *B. flavus* is ♂ 30 mm. and ♀ 30–34 mm. Ricardo states also that *B. flavus* is smaller than the species *B. coriarius*, but the dimensions given in her paper are just the opposite—*B. coriarius*, ♂ 27 mm.; *B. flavus*, ♂ 30, ♀ 35 mm. This must be a mistake, and, as the difference in size is considerable and of some importance, it is mentioned here.

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 LOEW. "Ueber die europäischen Raubfliegen (Diptera asilica)." Linnæa entomologica. Berlin, 1849.

EXPLANATION OF PLATE XV.

- Fig. 1. *Phellus glaucus*.
 Fig. 2. *Phellus piliferus*, sp. n.
 Fig. 3. *Questopogon clarkii*, gen. et sp. n.
 Fig. 4. *Machimus forrestii*, sp. n.

LIII.—*Note on some Young Stages of Gecarcoidea lalandii*, Milne-Edwards. By GLADYS E. WEBB, M.Sc., Assistant in Zoology Department, University College, London.

Gecarcoidea lalandii, M.-Edw., is the common Red Crab of Christmas Island. It is mentioned (under the name of *Gecarcinus lagostomus*) by Dr. C. W. Andrews in the 'Monograph of Christmas Island' (1900), where its annual migration to the sea for the purpose of hatching off its eggs is also described.

The following account of the collection of young stages believed to belong to this species is given by Dr. W. T. Calman (Proc. Zool. Soc. 1909, p. 710):—"On his